Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Spectrum Policy Task Force Seeks	)	ET Docket No. 02-135
Public Comment On Issues Related	)	
To Commission's Spectrum Policies	)	
	)	
Public Notice DA 02-1311	)	
Released June 6, 2002	)	

Supplement to Reply Comments of
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DBA LMS Wireless

(Late Filed Ex Parte)

"ATLIS" White Paper filed 9-6-02,
Supplement:

Further Regarding a 902-928 MHz "Public Chip" in all CMRS Devices Providing Location and Monitoring for Safety and Efficiency: E911, ITS, 4G Ad Hoc Networks, and *"Spot Market Wireless"* Enabling Spectrum and Market Efficiencies

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Introduction

Warren C. Havens ("Havens") and Telesaurus Holdings GB, LLC ("Telesaurus") together DBA "LMSW," filed on 9-6-02 a white paper in the above-captioned proceeding (the "9-6 Filing"). It proposed an "Advanced Technology Land Infrastructure Service" ("ATLIS") to provide mission-critical wireless for Public Safety ("PS"), Critical Infrastructure ("CI"), and compatible Private Enterprise ("PE"). This white paper included a description of potentially-mandated wireless capability in all CMRS devices to operate on ATLIS[1] via an embedded ATLIS RF chip, in order to provide for superior E911 service than currently being developed and contemplated, a variety of critical Intelligent Transportation System ("ITS") communication functions, and other functions for public safety and transportation efficiency (herein, the "Public Chip") (in the 9-6 Filing, see Exhibit 3, copy attached below, items 1 and 2).

The mandated Public Chip would operate on the 26-MHz wide Location and Monitoring Service ("LMS") spectrum (902-928 MHz). It would provide modest-speed two-way data and real-time voice. It would provide highly accurate location and tracking via transmitting embedded GPS-receiver fixes and signals for terrestrial location determination. (Vendors could provide Public Chips with additional capability, as long at the mandated functions were provided.)[2]

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[1] The functions described herein would be most easily achieved via CMRS radio devices installed in vehicles rather than in handheld devices, since vehicles provide more space for the components (hence, less time and cost involved in reduction and integration), more power from the vehicle battery, and better antenna systems, including greater potential for diversity and smart antenna systems. Thus, it would make sense to first mandate the Public Chip in vehicle-installed CMRS radios, such as in Telematics computer/communication units. A second phase would be inclusion in portable devices.

[2] For example, for public "hot spot" system access (802.11[*], ITS 5.9 GHz DSRC, etc.).

Herein, we primarily discuss basic concepts regarding how such a Public Chip could also, beyond the E911 and ITS functions, facilitate *spectrum* and *market* efficiencies in CMRS by providing what we describe as "Spot Market Wireless" or "SMW." We also note how the Public Chip could embody and facilitate 4G "smart radio" techniques to increase spectrum use in time and space, a topic of interest to the Task Force and a focus of the DARPA XG project.

The functions LMSW proposes for the Public Chip in the 9-6 Filing and in this Supplement are consistent with the Commission's original objectives and foresight in creating the LMS. The entire ATLIS plan, including the Public Chip functions, would fulfill and complementarily expand the broad scope for the LMS described by the Commission in the LMS rulemaking proceedings.

SMW could be implemented either as we propose, via a Federally mandated capability in all CMRS, or possibly by the market without such mandate. In this Supplement filing, we only discuss SMW via the ATLIS Public Chip, since we believe it is the most feasible and best means to implement SMW, via the most available and cost-effective spectrum, and since it would provide, in addition to SMW, the cornerstone for much-improved E911, and a host of sorely needed ITS functions and 4G techniques.

These mandated ATLIS Public Chip functions would be, under the ATLIS plan, provided on a not-for-profit basis (assuming here that it would not use more than a certain amount of total spectrum capacity, to be defined).[3] (See the LMSW 9-6 Filing regarding potential funding mechanisms.)

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[3] The Public Chip operation would share the entire spectrum with the PS, CI, and PE usage via active coordination of spectrum use in time and space, consistent with concepts of the Spectrum Task Force and the DARPA XG project (see end of this note). In this regard, this ATLIS proposal for the 26-MHz-wide 902-928 MHz, where the multi-function Public Chip services would underlay or share the spectrum with the PS/CI/PE services, would be an ideal

The PS, CI, and PE licensees under the ATLIS plan would benefit by sharing the spectrum with this Public-Chip function operating on CMRS devices, including via an increased volume of radio-frequency based components for this spectrum, and, for Public Safety and ITS applications, the direct use of the Public Chip for E911 and a host of ITS functions (see the 9-6 Filing, and further discussion herein). Also, in emergencies, CMRS devices could be used on the PS and CI ATLIS networks if there was an insufficient supply of mission-critical-class radios, since all CMRS devices would have the ATLIS Public Chip. CMRS providers would benefit via relief from costly E911 obligations, by a more competitive and efficient market (see below), and by use of the Public Chip location function in 4G technology and networks.

ATLIS Public Chip
and Spot-Market Wireless

The Public Chip would allow all CMRS users to select among the CMRS providers[4] in time and location as follows:

(i) As the market may decide, CMRS devices would have the capability, via hardware or software, to operate on multiple CMRS bands and technologies, and to use various Quality of Service classes (principally, Conversational, Steaming, Interactive, Background). This is increasingly being done and should become more prevalent and cost effective as technology continues to improve.

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candidate. (Regarding this XG project, see, e.g., Paul Kolodzy, "XG Initiative," DARPA/ATO, 25 April 2001.)

[4] It could also notify the CMRS user of the presence of "hot spots" including public Wi-Fi, 5.9 GHz ITS, Free Space Laser, and other high-speed access systems, for manual or automatic connection (assuming the device was equipped to use such systems, or that the device user otherwise wanted this information in case he/she carried other devices so equipped). Likewise, it could provide the same function regarding satellite coverage and balloon (e.g., Space Data) coverage in areas not served by terrestrial wireless networks.

(ii) These devices would also have location/ on-going tracking capability via GPS and terrestrial multilateration.[5]

(iii) The devices would—when manually prompted by the end user, or per pre-set criteria, or per the user's choice of settings—be fed data on the CMRS services available at the given location and time (various vendors and their various QoS Class offerings and pricing). For this purpose, it would need to have access to this information per FCC mandate. The information would come from the CMRS providers (access to their network data for predictive and real time determinations) via an appropriate clearinghouse for this purpose, and perhaps supplemented by spectrum monitoring devices in certain areas.

(iv) The device user could then, on the spot, make a purchase, and change such decision as often as he or she sought. The user could have a default setting to a particular carrier and QoS class(es) or could elect such per each communication.

In brief, the idea is simply to provide more information and choice and by such a more efficient market. In purchase of most basic goods and services, the consumer has easy access to a variety of providers. Even when the consumer sticks with a provider over a long term, it is the option to change and ease of change that provides a level of price/performance that makes such lack of change an acceptable option. In CMRS, which is a basic service these days, there is not yet a very efficient market. To get a good deal, the user generally must contract for a year or more of service, and buy a quantity of airtime

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[5] Also, the accuracy of network-based location technique employing one frequency could be enhanced by using the ATLIS spectrum along with the CMRS spectrum the CMRS device operates on. Use of two frequencies, in techniques such as the "Radio Camera" technique of (the former) US Wireless, will greatly enhance the "resolution" of the location determinations due to greater distinction in the combined (two frequency) multipath readings verses readings of one frequency. LMSW was exploring this with US Wireless before it filed bankruptcy and was sold to Traffic Masters.

minutes that is either too much or too little; it is hard to switch; number portability is not yet in place or a solution; etc. The proposed SMW would greatly improve market efficiency in CMRS and remedy these and other shortcomings.

SMW as described would also allow carriers to market their capacity more effectively as they each could inform all CMRS users of their various QoS Class offerings in a given time and location. As currently conceived, the Public Chip would present to the CMRS user basic data on available carriers and their offerings in time and location. If a CMRS provider wished to transmit additional information, it could do so via the CMRS carrier spectrum if the end user elected to receive advertisements, or it could post it on a website for easy access by the CMRS device, including via text-to-voice. By these arrangements, CMRS providers could test the market quickly and efficiently for various offerings and respond per market demand.

Such an arrangement would increase many fold the competitiveness in wireless, since the end-user would not be tied nearly as locked down to one carrier's coverage, offerings, service contracts, and pricing, and since carriers could much more quickly and efficiently know and respond to market demand.

This, in turn, would increase usage and drive technology improvements including for spectrum efficiency. It may be a more effective means and would be a more market-driven means to achieve spectrum efficiency than FCC mandates or flexibility aimed directly at spectrum efficiency. In any case, it would complement the latter.

Carriers would either cooperate to implement such plan, or (more likely for some time) new entities would arise that buy capacity from carriers on a wholesale basis (which

could vary from long term contracts to short-range spot purchases as in the electric generation market), and make the multiple offerings available to their customers.

In addition, SMW as described should also stimulate small businesses entering CMRS, filling valuable niches that the large nationwide and regional carriers do not serve or under serve. This is because such smaller operators would have access to the SMW market along with the larger carriers, and if they have a good product on a band and using a protocol that is supported by enough CMRS devices (see above), then they would be able to compete.

Enabling 4G Wireless

By its location/ tracking function, the Public Chip could facilitate Ad Hoc and peer-to-peer networks—spectrum-efficiency concepts of the Spectrum Task Force and DARPA XG. Also, via multi-band, multi-protocol CRMS devices that would predominate in SMW, spectrum efficiency could increase via use of multiple bands and protocols in a particular communication or for sequentially communications, as may best suit the nature of the communication, the demand, and the price the user is willing to pay. By such functions, the Public Chip could also facilitate spectrum underlays in bands in which underlays are implemented. (See footnote 3 herein, as to how the ATLIS LMS 902-928 MHz band could itself be a test bed and home for coordinated underlay wireless: the CMRS Public Chip functions would underlay the PS, CI, and PE uses.)

FCC Mandate

Should the government mandate a Public Chip for the wireless marketplace efficiency and other described purposes? The FCC has mandated E911 for public safety. Major highways and transportation facilities are publicly mandated and operated. There

are many other mandates and facilities to provide for critical public safety and efficiency in transportation and communication. Similarly, it can mandate measures for market efficiencies and spectrum efficiencies in CMRS wireless as noted above.

The proposed ATLIS plan including the Public Chip functions should be subject of rulemaking in which these matters are explored. For this purpose, LMSW has submitted the 9-6 Filing and will submit this Supplement in Docket RM-10403 (considering rulemaking in 902-928 MHz).

Respectfully submitted,

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Attachment

Below is Exhibit 3 from the LMSW 9-6 Filing

Exhibit 3

Additional ATLIS Functions and PS Funding Mechanisms

Note: in items 1, 2, and 3 below, the ATLIS-enabled CMRS devices or the ATLIS radios would have integrated location capability (network and/or GPS) (a core capability in all 3G wireless and beyond):

ATLIS-enabled CMRS for E911, basic ITS functions, etc.

1. ATLIS networks, once sufficiently built out (equal or better coverage than CMRS), could replace and improve on CMRS for E911. CMRS devices and would all have FCC-mandated ATLIS RF chips for E911 calls, and by such they could be connected not only to PSAP's but via PSAP's to responders in the field (PS, and if needed, CI) heading to or at the incident location. Also, unlike CMRS-based E911, such ATLIS E911 would allow for group calls to the victims: often, responders will include a number of entities, such as police and medical, police and fire and medical, etc. This arrangement would save CMRS money (E911 is costing CMRS billions of dollars to launch, and eventually more to maintain) and lessen fears and insurance costs regarding liability: This savings would offset cost of the mandated ATLIS RF chip and (see text above). (CMRS could, of course, pass on the net costs, if any, to their subscribers.)
2. The same ATLIS RF chips would be DOT-mandated for installed or docked radios in all roadway vehicles (in most cases included in Telematics devices providing for communications, location, information, computing, and entertainment) to allow for "electronic license plates" and other basic safety functions, e.g.:

a. Authorization, by "smart" highway corridors, to qualified vehicles to use HOV and LEV highway lanes/ time slots (others get tickets automatically), or variable charges of highway lanes and time slots depending on the level of its noxious emissions, level of passengers per vehicle class, and congestion level.[1]

b. "Push" and "pull" notification of dangerous or congested road conditions ahead (and disabling entertainment and [other] communications where warranted).

c. PS one-way broadcasts of voice and data messages in certain emergencies.

d. Other functions under the general capability provided whereby vehicles on the road can interact with PS and the (increasingly "intelligent") highway systems, saving tens of thousands of life per year and (per ITS America) and billions of dollars in lost workforce productivity, mitigating environmental impact, etc.

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[1] A partial implementation of this concept is Singapore's Electronic Road Payment ("ERP") system currently in operation. From the Singapore Land Transport Authority website: http://www.gov.sg/lta/MenuFrame2.htm.

> Electronic Road Pricing (ERP) is simply an electronic system of road pricing. It is designed to automate our current road pricing system - no more paper coupons or enforcement officers at the gantries. The main difference is the pay-when-you-use principle. This is a fair system as the motorist is charged only if he passes the ERP gantry.
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> Its Aim. With ERP, motorists will be more aware of the true cost of driving. Charges will be levied on a per-pass basis and can vary according to time and congestion levels. With this system of charging, a motorist will be encouraged to choose whether to drive, when to drive and where to drive. He may choose a different route, destination, time of travel, or not to travel at all. He may decide to car-pool or use public transport. Those who choose to pay and stay on the road will enjoy a smoother ride.
>
> Its Advantages. *Fair*: Charges are based on usage so those who contribute more to the congestion, pay more and those who use the roads less frequently or who travel during non-ERP hours will enjoy more road tax rebates. *Convenient*: No need to buy daily/monthly paper licences. *Reliable*: Does not need human enforcement personnel, thereby removing the potential for human error.

In short, ITS wireless should not be left to a patchwork of CMRS and small private systems.[2] ATLIS can make ITS wireless effective as a principal goal: PE ATLIS can carry most of the ITS traffic. This was clearly contemplated by the FCC when allocating the Location and Monitoring Service in the 902-928 MHz band.[3] See also the TIA-ETSI Project MESA's description of the need to coordinate advanced ITS and PS wireless is in the Project MESA Statement of Requirements, including in §8.6 "Transparent network and system access" in the ETSI draft V.10, at http://www.projectmesa.org/SoR.htm .

Regarding items 1 and 2 above, the owners of the ATLIS-enabled devices would be charged a monthly fee (collected by the CMRS provider) for the Federally mandated capabilities and use of all Federally mandated functions. (If, e.g., $1/month/device, and assuming 120 million devices, and 10¢/device collection and handling fee to CMRS, then the net proceeds would

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This Singapore ERP uses RF readers such as used in "EZ Pass" technology on Non-multilateration LMS spectrum. Our idea in the text above would expand on this ERP system including via (i) use of wide-area wireless networks tracking the vehicles (integrated with fixed-point EZ pass type ID readers) so that a larger extent of highways throughout a region are involved, and (ii) more sophisticated electronic tags or license plates and more levels of pricing including for High Occupancy Vehicles ("HOV's"), Low Emission Vehicles ("LEV's"), noxious emissions, etc.

[2] See: Paul Najarian, "Is a Wireless Architecture the Future of ITS?" in *ITS View* (journal of ITS America), July 2001 Issue, available at below Web link. http://www.itsa.org/ITSView.nsf/ff53871fee52042a85256a6e00096b5b/73f38dcdc16296b185256a6f000b816c?OpenDocument . Mr. Najarian, at the time of writing the article, was the ITS America director of Telecommunications and also directed its ITS Public Safety and Telematics. This article discussed the need for a dedicated communications architecture and infrastructure, including its wireless infrastructure components, for Intelligent Transportation System applications, discussed how this need is not being met by existing plans and available networks and technologies, and proposes steps toward meeting this need. ATLIS would in large part provide for these needs, in conjunction with the new 5.9 GHz DSRC services.

[3] See FCC releases in PR Docket No. 93-61. Available in the LSM auction "Bidder Package" at: http://wireless.fcc.gov/auctions/21/releases.html#bip .

be $1.3 billion/year.) If PS ATLIS network capability is solely used for these functions, then all the net proceeds would go to PS; if PE capability is involved, then it would obtain a prorata amount of the proceeds. In addition, CMRS users electing to use the ATLIS capability for certain ITS-functions or other functions provided by PE ATLIS would pay use fees to PE (per collection arrangement with CMRS or direct billing by ATLIS PE).

Greater Back-up Capacity. Via the arrangements described above (whereby all CMRS phones would be capable of operating on the ATLIS network, at least for certain basic voice and data functions), in a large-scale emergency, if there were not sufficient ATLIS radios in the affected area,[4] [5] then PS, and the various other persons involved in emergency responses (professional and volunteer) working under PS, could use the ATLIS-enabled CMRS phones (again, while these would not have all of the functions of an ATLIS radio, they would be serviceable in such cases), and by such, keep communications interoperable on the ATLIS network.

3. Asset tracking for Homeland Security. Tracking assets, including large shipping containers and their contents, besides having major commercial value, presents one of the major unsolved problem areas for Homeland Security due to the potential for using them as means to deliver contraband and for terrorism. This was discussed at the annual meeting of the Intelligent Transportation Society at the session on 4-30-02 "Tracking and Tracing Assets,

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[4] In such case, ATLIS radios could be borrowed from other areas, but this could take time, and would have limits that may be exceeded in some cases.

[5] Per the priority-access arrangement described in the text above (whereby PS and CI would have priority access to all PE ATLIS network capacity in defined emergencies), the more PE network capacity is built out, the more back-up *network* capacity is available for PS. But to use this PE network capacity, PS needs reserve radios. Since they will probably only keep modest reserve radios for day-to-day and "routine" emergencies, the issue is: where to get a larger pool of reserve radios in especially large-scale emergencies. The above is a solution.

Cargo, and Operators." Currently, there are inadequate means at US borders and internally to check container contents, assure that locks and seals are not broken after inspection on route, etc. Once ATLIS is sufficiently built out, it can provide the needed functions, probably in conjunction with an integrated Mobile Satellite Service (see footnote __ in text above).

4. Wireless links for remote environmental monitoring: of water, air, ozone, etc., for point source pollution and overall ecosystem health; for certain wildlife monitoring; and for detection of intentional or accidental pollution via chemical, biological, or nuclear releases. For this, foundation and corporate vendor co-funding grants would be sought, in conjunction with uses by research institutions and other educational functions.
5. Nextel swap of 800 and 900 MHz for public safety 700 MHz[6] (when the TV's are cleared off), thus consolidating public safety at 800 to 900 MHz (including 902-928 MHz). This could save billions of dollars in potential relocation costs to PS and CI under currently discussed plans for mitigation of interference in 800 MHz. Also, 900 MHz is used in Europe now for mission-critical communications: the GSM-R band (in 876 - 915 MHz and 921 - 960 MHz) (GSM 900 itself is 880-915 MHz and 925-960 MHz), and as 3G CMRS develops worldwide on new UMTS spectrum, it is possible that in time some current GSM 900 spectrum will be available for PS and CI, thereby increasing the market for products developed on the ATLIS 900 MHz component spectrum. In this regard, a goal of the TIA-ETSI Project MESA for advanced PS wireless is uniform spectrum in the US and Europe.

[6] [Note: since preparing the above Exhibit to the 9-6 Filing, LMWW has submitted comments in WT Docket 02-55 (Interference/ consolidation in 800 MHz) with additional ideas as to how the ATLIS proposal would contribute to solutions sought in that docket.]